The Sydney children's Hospitals Network
care, advocacy, research, education

ANAPHYLAXIS AND GENERALISED ALLERGIC REACTION (GAR) IN ED AND AT HOME

PRACTICE GUIDELINE ©

DOCUMENT SUMMARY/KEY POINTS

- **Anaphylaxis:**
  - Has been defined as: Any acute onset of hypotension or bronchospasm or upper airway obstruction where anaphylaxis is considered possible, even if typical skin features are not present.
- **Generalised Allergic Reaction (GAR)**
  - A reaction characterized by one or more symptoms or signs of skin and/or gastrointestinal tract involvement without respiratory and/or cardiovascular involvement.
- **Management:** If any symptoms of anaphylaxis are present treatment according to the anaphylaxis algorithm should be commenced immediately.
  - Senior medical advice may be required call for assistance as needed.
  - Airway – give supplemental oxygen.
  - If airway threatened, call emergency number:
    - **Code Blue 777** (SCH) or
    - **Cardiac Arrest 444** (CHW)
    - **Triple Zero 000** (HITH in the home)
- All patients who have had an anaphylactic reaction should be observed for a minimum of 4 hours post adrenaline.
- For Hospital in the Home [HITH] (previously known as CAPAC), always contact the child's medical team once the child is stable.

This document reflects what is currently regarded as safe practice. However, as in any clinical situation, there may be factors which cannot be covered by a single set of guidelines. This document does not replace the need for the application of clinical judgement to each individual presentation.

Approved by:	SCHN Policy, Procedure and Guideline Committee	
Date Effective:	1st October 2015	Review Period: 3 years
Team Leader:	Fellow	Area/Dept: Paediatrics SCH

CHANGE SUMMARY

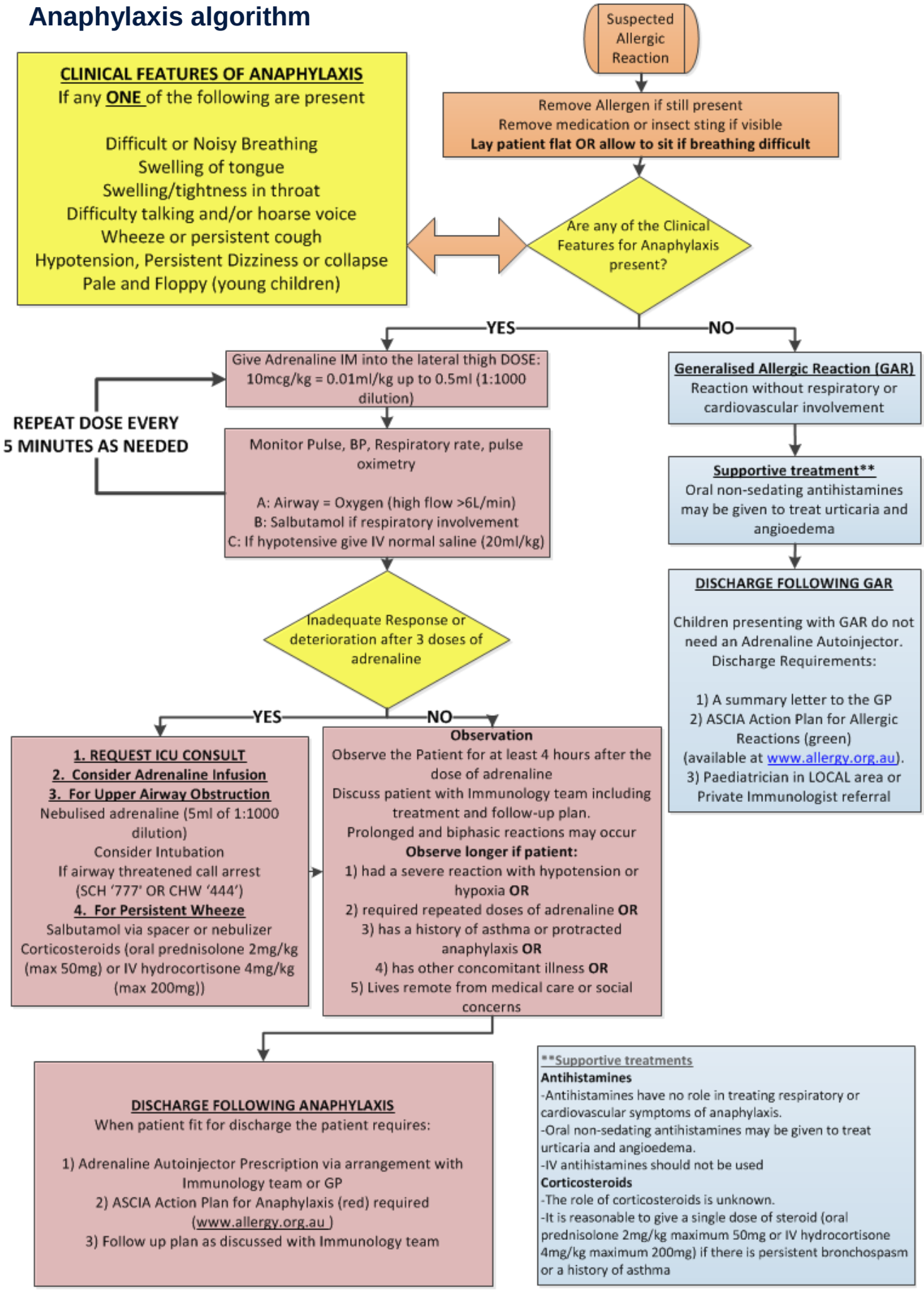
- New SCHN document
- Rescinds:
  - SCH Document C.16.A.7"Anaphylaxis and Generalised Allergic Reaction (GAR) "
  - CHW guideline 2010-0013 "Anaphylaxis & Allergy Management in ED"
  - CAPAC guideline 2009-0039 "Anaphylaxis Management: Patients Receiving IV Medication at Home – CAPAC"
- Many changes between previous documents although practice remains similar.

READ ACKNOWLEDGEMENT

- **Emergency Department CHW and SCH**: Clinical staff: medical officers, nurses and pharmacists need to understand and acknowledge this document.
- **HITH**: Clinical nurses undertaking "Hospital In The Home" visiting need to understand and acknowledge this document and have appropriate training in EpiPen use.
- **Other Areas**: Discretionary: Manager to determine which staff need to read and acknowledge this document.

This document reflects what is currently regarded as safe practice. However, as in any clinical situation, there may be factors which cannot be covered by a single set of guidelines. This document does not replace the need for the application of clinical judgement to each individual presentation.

Anaphylaxis algorithm



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Clinical Definitions

Definitions of anaphylaxis vary considerably. For the purpose of this guideline we will use the Australasian Society of Clinical Immunology and Allergy (ASCIA) definitions of Anaphylaxis and Generalised Allergic Reaction: [ASCIA]

Anaphylaxis

- Any acute onset illness with typical skin features (urticarial rash or erythema/flushing, and/or angioedema) PLUS involvement of respiratory and/or cardiovascular and/or persistent severe gastrointestinal symptoms

Or

- Any acute onset of hypotension or bronchospasm or upper airway obstruction where anaphylaxis is considered possible, even if typical skin features are not present.

Symptoms/signs of respiratory/cardiovascular involvement are:

Respiratory:

- Difficulty/noisy breathing
- Swelling of tongue
- Swelling/tightness in throat or tightness in chest
- Difficulty talking and/or hoarse voice
- Wheeze or persistent cough
- Cyanosis

Cardiovascular:

- Loss of consciousness
- Collapse
- Pallor and floppiness (in young children)
- Hypotension

Generalised Allergic Reaction (GAR)

A reaction characterized by one or more symptoms or signs of skin and/or gastrointestinal tract involvement without respiratory and/or cardiovascular involvement.

Skin:

- Generalised pruritus
- Urticaria / Angioedema / Periorbital Oedema
- Generalised Erythema
- Eczema

Gastrointestinal*:

- Abdominal pain
- Vomiting
- Loose stools

(*These are signs of anaphylaxis for allergies to insect stings and injected medications)

Diagnosis

The diagnosis of anaphylaxis and GAR is clinical. Use the ASCIA definitions above as a guide. Investigations have little role in acute diagnosis and management. If the diagnosis is uncertain, for example in the case of a child with sudden onset severe respiratory distress, you could consider a serum mast cell tryptase level (3ml in a 'red top' clotted blood tube) in consultation with senior staff. Tryptase is often normal in food related anaphylaxis. While urticaria and angioedema are commonly associated with anaphylaxis, they may be absent in up to 20% of presentations. A differential diagnosis of anaphylaxis must be considered in any case of acute onset respiratory distress, bronchospasm, hypotension, or cardiac arrest.

GARs, involving generalised erythema, urticaria, periorbital oedema, or angioedema without signs of respiratory or, cardiovascular involvement do not constitute anaphylaxis.

Pathophysiology

The pathogenesis of anaphylaxis involves an acute, rapidly progressive, potentially life-threatening immediate hypersensitivity triggered by histamine and other chemical mediators released from mast cells due to surface bound specific-IgE. A non-IgE mediated anaphylactic reaction (previously called anaphylactoid reactions) may have similar symptoms; however, the mediator release occurs independent of IgE binding to mast cells. There is no practical difference in the acute management of these conditions. Multiple organ systems are affected, and at its most severe, it is characterised by bronchospasm, airway angioedema, and hypotension. The epidemiology of paediatric anaphylaxis is significantly different from adult anaphylaxis. The commonest causes of anaphylaxis in children are foods, medications, and insect venom. A careful history is most helpful in trying to identify a possible allergen.

Treatment of Anaphylaxis

- Immediate administration of adrenaline IMI. Dose is 10micrograms/kg given as:
  - 0.01 mL/kg of 1:1000 (1mg/mL) adrenaline intramuscularly into the anterolateral thigh (Maximum dose = 0.5 mL of 1:1000 (1mg/mL))
- Further doses of IM adrenaline may be given every 5 minutes for persistent symptoms of anaphylaxis
- Get senior medical advice, call for assistance as needed
- Airway – Supplemental Oxygen
  - Nebulised adrenaline may also be considered for stridor. Give 5mL of 1:1000 (1mg/mL) adrenaline [or 0.5ml/kg/dose of 1:1000 adrenaline if <10kg]. However, do not delay endotracheal intubation if evolving airway obstruction
  - If airway threatened then call
    - **CODE BLUE (777) at SCH**
    - **CARDIAC ARREST (444) at CHW**

- Breathing – Salbutamol via spacer or nebuliser if wheeze
- Circulation – large bore IV access if hypotensive/poorly perfused, 0.9% sodium chloride fluid bolus 20 mL/kg and repeated if needed.

Additional therapy:

- Oral antihistamine – once patient stable and able to tolerate
- Steroids – as indicated – see note below

- Consider ICU consultation and adrenaline infusion if 3 or more doses of IM adrenaline are required and/or persistent hypotension.

Anti-Histamines

- In a child with anaphylaxis, antihistamines should only be given after the administration of adrenaline
- Oral antihistamines can be used to reduce cutaneous symptoms. They do not treat or prevent anaphylaxis. A non-sedating antihistamine such as:

Age	Anti-histamine	Dose
6-11 months	Desloratadine	1mg daily
1-2 years	Loratadine	2.5mg daily
3-6 years	Loratadine	5mg daily
Over 6 years	Loratadine	10mg daily

- Sedating antihistamines should be avoided
- Parenteral (IVI or IMI) promethazine (Phenergan) should **not** be used in anaphylaxis as it may worsen vasodilation and hypotension and can cause muscle necrosis.

Steroids

There is little evidence to support the use of corticosteroids including in the prevention of biphasic reactions, however may be used at the discretion of the treating physician.

They do have a theoretical place in severe anaphylactic reactions in children where bronchospasm is a major feature or where there is a background history of asthma.

Corticosteroid can be given as oral prednisolone (2 mg/kg/dose up to 50mg) as per **asthma management guidelines** or as intravenous hydrocortisone (4 mg/kg/dose) as stat doses.

Treatment of Generalised Allergic Reactions (GAR)

- GAR are mild to moderate allergic reactions without respiratory or cardiovascular involvement and are not life-threatening.
- If a child has gastrointestinal symptoms and the trigger is venom or injected drug this constitutes anaphylaxis and requires treatment with adrenaline. If in doubt discuss the case with the ED Consultant or Immunologist on-call.
- Allergens may be ingested, inhaled or come into contact with the skin. The mode of contact may influence the extent of the reaction.
- Urticaria persisting more than 24 hours is usually not due to an allergic reaction unless repeated exposure to the allergen occurs.
- Angioedema is common; however without signs of airway involvement (see definition of anaphylaxis above) does not equal anaphylaxis and can be managed as a GAR.
- GARs can be managed with a non-sedating antihistamine:

Age	Anti-histamine	Dose
6-11 months	Desloratadine	1mg daily
1-2 years	Loratadine	2.5mg daily
3-6 years	Loratadine	5mg daily
Over 6 years	Loratadine	10mg daily

- Usually moderate GAR with gastrointestinal and/or skin involvement only should not be treated with adrenaline. However, the patient must be monitored for the development of respiratory or cardiovascular involvement, as some cases with rapidly progressive symptoms will benefit from the early administration of adrenaline.
- Children with symptoms of a GAR do not need to be discussed with the immunology team unless there are specific management concerns.

Observation

- All patients who have had an anaphylactic reaction should be observed for a minimum of 4 hours post adrenaline.
- All children who are treated for anaphylaxis should have their case discussed with the immunology fellow during the day and on-call immunologist after hours.

Admission

- Admissions should be discussed with the ED consultant or fellow.
- Indications for admission include:
  - Anaphylaxis requiring more than 1 dose of adrenaline or fluid bolus

- Anaphylaxis requiring 1 dose of adrenaline, but with residual features/symptoms of a GAR (other than isolated cutaneous symptoms) 4-6 hours post adrenaline
- Social concerns or Senior ED Staff concerns

- Admission may also be considered for children on regular beta blocker medication.
- Admissions can be:
  - Under the emergency team
    - To the Emergency Medicine Unit (EMU) at CHW
    - As a short stay admission at SCH
  - Under the immunology team to the ward

Consider ICU consultation for cases refractory to management.

Discharge from the ED

1. All children who are treated for anaphylaxis should have their case discussed with the immunology team as soon as practical who will recommend follow up.
2. Following anaphylaxis and an observation period of at least 4 hours after the last dose of adrenaline a patient may be discharged from the ED.
3. Before discharge all children who have presented with anaphylaxis should be discharged home with a prescription for an Epipen, which can be arranged after discussion with the immunology team. An Epipen prescription should be given with Epipen training and a red allergy action plan ASCIA action plan for anaphylaxis (red plan, available at http://www.allergy.org.au/health-professionals/ascia-plans-action-and-treatment).
4. Children presenting with a GAR do not need an Epipen and should be discharged home with an ASCIA action plan for allergic reactions (green plan, available at http://www.allergy.org.au/health-professionals/ascia-plans-action-and-treatment).

Follow up

All patients need a clear plan regarding follow up when discharged from the ED.

All children presenting with anaphylaxis: A discharge letter for their GP & a referral letter for the Immunology clinic addressed to the Immunology consultant on call [ie: the person you spoke to].

All children presenting with a GAR: a discharge letter for their GP & a referral letter for a general paediatrician. Referrals to the allergy clinic at both SCH and CHW, for non-anaphylactic reactions can only be made by a paediatrician.

Any child may be seen by a private paediatrician or immunologist/allergist if their parents and GP wish to refer.

References

1. Australian Society for Clinical Immunology and Allergy, *ASCIA Action Plans and Checklists*. http://www.allergy.org.au/health-professionals/ascia-plans-action-and-treatment (accessed 19/05/2015)
2. Australian Department of Health, Pharmaceutical Benefits Scheme, *Adrenaline,* http://www.pbs.gov.au/medicine/item/3409K-8698T (accessed 19/05/2015)

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Appendix 1: Hospital in the home (HITH) - Management of anaphylaxis

Patients Receiving Intravenous Medication At Home

The nurses working for the hospital in the home (HITH) administer intravenous antibiotics or other medications in the home. This protocol allows the HITH nurse to administer intramuscular adrenaline in the event of an anaphylactic reaction during or following administration of intravenous medications in accordance with this policy.

Children with the following conditions are excluded from receiving intravenous antibiotics at home.

- History of mastocytosis
- Previous adverse reactions to intravenous medication
- Currently taking beta-blocker medication (adrenaline may not be effective)

Preparing for transfer to HITH

- The HITH nurse responsible for direct patient care must have received training and is competent in recognition and treatment of anaphylaxis in paediatric patients.
- Every child transferred to HITH will receive the first dose of medication in a hospital setting.

Preparing for home visit

- The HITH handover sheet to have contact details for treating team, in case of emergency.
- Ensure an **anaphylaxis kit** is taken on all visits where a child needs intravenous medication. An anaphylaxis kit can be obtained from pharmacy. Each HITH nurse will hold 1 kit per work bag. When you have used the kit it can be replaced by pharmacy.

Each anaphylaxis kit contains:

- 2x Epipen 150micrograms (for patients <20kg)
- 2x Epipen 300micrograms (for patients >20kg)
- Loratadine 1mg/mL syrup
- Desloratadine syrup
- Salbutamol (Asmol) 100microgram/puff inhaler 200 dose
- Spacer device
- Oral syringes x 1 size 5mL and 10mL
- Disposable resuscitator
- Drug dose card
- 1 x general ASCIA action plan for anaphylaxis (see below)

At the home visit

- Follow the procedure for administration of IV medication.
- Check the five rights: - route, drug, dose, patient name and time.
- Watch for signs of adverse reactions

Anaphylaxis or GAR

- If you suspect an allergic reaction follow the ASCIA action plan for anaphylaxis (appendix 2)
- If the child develops any one of the signs of anaphylaxis give adrenaline by administering the EpiPen
  - EpiPen Jr (150micrograms) if <20kg

    or
  - EpiPen (300micrograms) if >20kg
- In the event of immediate threat to life due to anaphylaxis consider EpiPen junior for infants <10kg
- After giving adrenaline **call an ambulance (000)**. All children who have received adrenaline should be transferred by ambulance to the ED for a minimum of 4 hours observation.
- As per the ASCIA action plan further doses of adrenaline may be given after 5 minutes if there is no response and/or symptoms of anaphylaxis are persisting
- **Anti-histamines**: In a child with anaphylaxis, antihistamines should only be given after the administration of adrenaline
- Oral antihistamines can be used to reduce cutaneous symptoms. They do not treat or prevent anaphylaxis. A non-sedating antihistamine may be given such as:

Age	Anti-histamine	Dose
6-11 months	Desloratadine	1mg daily
1-2 years	Loratadine	2.5mg daily
3-6 years	Loratadine	5mg daily
Over 6 years	Loratadine	10mg daily

- Always contact the child's medical team once the child is stable.

Appendix 2: ASCIA Action plan for Anaphylaxis

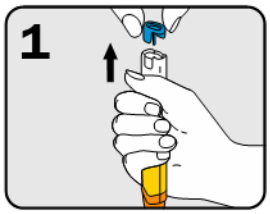
(for use by HiTH nurses administering home IV medications)

ascia
australasian society of clinical immunology and allergy
www.allergy.org.au

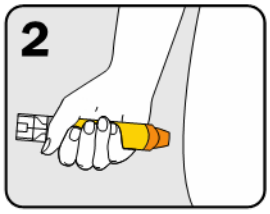
ACTION PLAN FOR Anaphylaxis

For use with EpiPen® adrenaline autoinjectors

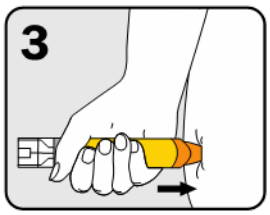
How to give EpiPen®



Form fist around EpiPen® and PULL OFF BLUE SAFETY RELEASE.



PLACE ORANGE END against outer mid-thigh (with or without clothing).



PUSH DOWN HARD until a click is heard or felt and hold in place for 10 seconds.

Remove EpiPen®. Massage injection site for 10 seconds.

MILD TO MODERATE ALLERGIC REACTION

- Swelling of lips, face, eyes
- Hives or welts
- Tingling mouth
- Abdominal pain, vomiting (these are signs of anaphylaxis for insect allergy)

ACTION FOR MILD TO MODERATE ALLERGIC REACTION

- For insect allergy, flick out sting if visible. Do not remove ticks.
- Stay with person and call for help.
- Locate EpiPen® or EpiPen® Jr adrenaline autoinjector.
- Phone family/emergency contact.

Mild to moderate allergic reactions may not always occur before anaphylaxis

Watch for ANY ONE of the following signs of anaphylaxis

ANAPHYLAXIS (SEVERE ALLERGIC REACTION)

- Difficult/noisy breathing
- Swelling of tongue
- Swelling/tightness in throat
- Difficulty talking and/or hoarse voice
- Wheeze or persistent cough
- Persistent dizziness or collapse
- Pale and floppy (young children)

ACTION FOR ANAPHYLAXIS

1. **Lay person flat. Do not allow them to stand or walk. If breathing is difficult allow them to sit.**
2. **Give EpiPen® or EpiPen® Jr adrenaline autoinjector.**
3. **Phone ambulance*: 000 (AU) or 111 (NZ).**
4. **Phone family/emergency contact.**
5. **Further adrenaline doses may be given if no response after 5 minutes, if another adrenaline autoinjector is available.**

If in doubt, give adrenaline autoinjector

Commence CPR at any time if person is unresponsive and not breathing normally.

EpiPen® is generally prescribed for adults and children over 5 years.
EpiPen® Jr is generally prescribed for children aged 1-5 years.
*Medical observation in hospital for at least 4 hours is recommended after anaphylaxis.

IF UNCERTAIN WHETHER IT IS ANAPHYLAXIS OR ASTHMA

- Give adrenaline autoinjector FIRST, then asthma reliever.
- If someone with known food or insect allergy suddenly develops severe asthma like symptoms, give adrenaline autoinjector FIRST, then asthma reliever.

Instructions are also on the device label and at: www.allergy.org.au/anaphylaxis

© ASCIA 2015. This plan was developed for use as a poster and to be stored with general use adrenaline autoinjectors.

Appendix 3

EpiPen®

An EpiPen is a form of self-injectable adrenaline and comes as:

- EpiPen® (for children 20 kg and over, 1:1000, 300micrograms, single dose – 2mL)
- EpiPen Jr® (for children under 20 kg, 1:2000, 150micrograms, single dose – 2mL)

EpiPens cannot be prescribed from the Emergency Department without involvement of the immunologist on-call or Allergy CNC (but GP can prescribe according to the criterion "Authority Required: Initial sole PBS-subsidised supply for anticipated emergency treatment of acute allergic reactions with anaphylaxis in a patient who has been discharged from hospital or an emergency department after treatment with adrenaline for acute allergic reaction with anaphylaxis").

EpiPen prescription must be accompanied by a comprehensive Anaphylaxis Management Plan including:

- Referral to an Immunologist.
- Training in when and how to use the EpiPen®.
- Identification of triggers if possible through a thorough history.
- Education on avoidance of triggers, especially for food allergies.
- Provision of an Anaphylaxis Action Plan.

In Australia, EpiPen® is listed on the Pharmaceutical Benefits Scheme (PBS) as an authority only script. PBS indications for EpiPen® prescription are:

- Anaphylaxis as defined above.
- Where the patient has received adrenaline in the ED.

EpiPen may be considered in the following circumstances. This should always be discussed with the Immunologist on-call before the EpiPen® is prescribed:

- GAR with one or more of the following:
  - Asthma, current or past history
  - Specific nut allergy
  - Specific insect bite allergy
  - Limited access to Emergency Medical Care (remote area).